

Human Health and Ecological Risk Assessments



Lower Willamette Group Risk Assessment Team

August 2001

Kennedy/Jenks Consultants

Engineers & Scientists

USEPA SF



1128874

Table of Contents

<u>Introduction</u>	2
<u>Key Personnel and Roles</u>	2
<u>Key Personnel – Kennedy/Jenks Consultants</u>	3
<u>Key Personnel –</u>	4
<u>Windward Environmental</u>	4
<u>Key Personnel –</u>	7
<u>Fishman Environmental Services, LLC</u>	7
<u>Key Personnel</u>	8
<u>Other Support Scientists</u>	8
<u>Risk Assessment Experience of the Team</u>	8
<u>Risk Assessment Experience - Kennedy/Jenks Consultants</u>	9
<u>Risk Assessment Experience – Windward Environmental</u>	9
<u>Risk Assessment Experience - Fishman Environmental Services (FES)</u> ..	10

Appendix A – Resumes, Key Personnel

Introduction

The Lower Willamette Group has selected the team of Kennedy/Jenks Consultants, Windward Environmental, and Fishman Environmental Services (FES) (Kennedy/Jenks Risk Team) to conduct the Human Health and Ecological Risk Assessments (HHRA and ERA) for the Portland Harbor Superfund Project. This document provides EPA and its Partners with the qualifications of the Risk Assessment Team in support of obtaining EPA's approval of the Risk Assessment contractor for the project.

Key Personnel and Roles

Kennedy/Jenks' Risk Team includes scientists from Windward Environmental and FES. Collectively, we have conducted numerous HHRA's and ERA's. Our risk assessments at Superfund and hazardous waste sites meet regulatory requirements and support effective remediation decisions.

Our risk assessment will generate management options focused on protection of human health and ecological resources. Kennedy/Jenks' Risk Team recognizes the importance of working closely with the Tribes, Trustees and Regulators, as well as our clients, to develop responsive, effective, yet practical, solutions to environmental problems.

In addition to Kennedy/Jenks scientists (Dr. Bill Williams and Gregg Bryden), our Risk Team includes Mike Johns, Lisa Saban, Matt Luxon, Tad Deshler, Susan McGroddy, and Kathy Godtfredsen of Windward Environmental and Paul Fishman, Tony Laska, Steve Johnson and Kim Gould of FES. Eric Friedman-Fishman of Metropolitan Group will be available, as needed, to provide risk communication support. An organization chart is attached as Figure 1 that illustrates the role of each individual. The Kennedy/Jenks Risk Assessment Team is highly experienced and knowledgeable about the Willamette River and the issues associated with the National Priority List (NPL) listing.

Our Team organization recognizes the strengths of the individual team members and places them in the team structure that maximizes their technical strengths. The following is a brief description of the proposed organizational structure and the roles each will provide in support of the Portland Harbor risk assessments. Dr. Bill Williams will serve as Project Manager for all risk assessment activities, provide liaison to the Lower Willamette Group (LWG), and will work with other LWG consultants tasked with executing the EPA Statement of Work (SOW). Dr. Williams will also provide technical oversight to the ERA, and the technical lead for the assessment of risks to wildlife. Dr. Mike Johns will serve as deputy project manager providing support to Dr. Williams and assistance in developing the appropriate strategy for the successful completion of risk assessment activities. Dr. Johns will provide the technical oversight and direction for the aquatic ERA, supported by Windward scientists and the Kennedy/Jenks Consultants Team. Dr. Johns has managed several sediment related risk assessments within the Pacific Northwest and has served as a member of negotiating teams for four Region 10 Superfund SOWs in the past five years.

Ms. Laura Kennedy of Kennedy/Jenks will manage HHRA tasks, with technical support from Mr. Curt Griffiths of Kennedy/Jenks, and Mr. Tad Deshler of Windward Environmental. Mr. Deshler's HHRA specialty is fish and shellfish consumption at large aquatic sites. He developed and has applied a "market basket" approach to assessing risk at sites in the Pacific Northwest. In the market basket approach, site-specific estimates of risk that do not rely on default consumption scenarios are derived by matching consumption rates and tissue chemistry data for single species or groups of species. This approach provides realistic risk characterization that is tied to specific site characteristics.

In addition to Dr. Williams and Dr. Johns, technical leads for the ERA include Matt Luxon and Lisa Saban of Windward Environmental. Mr. Luxon has been at the forefront of modeling

ecological risk at the regional scale. His work includes developing comparative risk models to assess the relative contribution of various chemical, physical, and biological stressors to degradation of ESA-listed species, and is currently conducting an assessment of risks to fish species within the Duwamish/Green River watershed. He was an invitee to the recent SETAC-sponsored Pellston conference on complex stressors, which developed tools in toxicology and risk assessment for evaluating effects of multiple stressors on multiple receptors at the regional scale. Mr. Luxon will be supported by several staff from Fishman Environmental Services, and by Dr. Kathy Godtfredsen of Windward Environmental. Dr. Godtfredsen has performed numerous aquatic and terrestrial ERAs at hazardous waste sites with multiple contaminants for both industrial and government clients. These assessments have ranged from screening level assessments to detailed risk assessments used to recommend cleanup levels for sediment. She is currently the technical lead for the Lower Duwamish River ERA and is the senior scientist responsible for the design and oversight of laboratory studies designed to better understand the relationship between dietary exposure to contaminants and effects on outmigrating juvenile salmon.

Lisa Saban of Windward Environmental will provide technical lead for the assessment of risks to benthic species. Since her research on sediment toxicology in the early 1990's, Ms. Saban has spent the last decade conducting ecological risk assessments and toxicological studies focused on impacts to aquatic systems. Ms. Saban has lead numerous sediment-related risk assessments, including Chevron's Port Arthur RFI (hydrocarbons and metals), USCG Tern Island (PCBs and dioxins), Hickam Air Force Base and Bellows Air Force Station (metals, chlorinated hydrocarbons, PAHs), Unocal Avila Pier Hydrocarbons, Skeena Cellulose (PCBs), Tulalip Landfill, benthic issues for a confidential client on the Duwamish, and conducted oversight and review of Puget Sound Naval Shipyard and Commencement Bay sediment-related risk issues in the Hylebos, east

and west waterway issues, St. Paul waterway, Sitcum, Harbor Island, and Asarco.

Fate and transport has been placed under the risk and data management support task because it will provide information useful to both the ERA and the HHRA. Dr. Said Amali, of Kennedy/Jenks, and Dr. Susan McGroddy of Windward Environmental will provide technical support. Dr. Amali's expertise includes evaluations of fate and transport of contaminants in dissolved, vapor, and non-aqueous-phase liquid forms for petroleum hydrocarbons, industrial solvents, and metals. Dr. McGroddy is an expert in the transport and fate of nonpolar organic compounds, such as PCBs, PAHs, and pesticides. Dr. McGroddy has also served as a technical lead in investigations addressing the bioavailability of TBT.

Key Personnel – Kennedy/Jenks Consultants

Bill Williams, Ph.D., Project Management/Risk Assessment

Dr. Bill Williams is a senior consultant with Kennedy/Jenks with more than 19 years experience in providing strategic planning and supervision of human and ecological risk assessment programs. Bill was instrumental in the development of numerous new techniques for use in the determination of exposure and effects of chemicals on wildlife populations. His background includes ecological and human risk assessment, and development of ecologically meaningful measurement endpoints that can be used in place of screening guidelines in risk assessments. These endpoints are relevant at the population and community level and can be incorporated into NRD assessments. He was a member of the U.S. EPA Ecological Risk Assessment Forum that produced the guidance for conducting Ecological Risk Assessments. He is a member of numerous international and federal committees and workshops as well as the National Academy to define risk assessment guidelines and other protocols used by U.S. EPA regulators. He maintains an excellent rapport

and respect with U.S. EPA and Oregon regulators, and is currently an active member of several U.S. EPA Science Advisory Panels.

Laura Kennedy, M.S., Human Health Risk

Ms. Laura Kennedy has extensive consulting experience that includes human health, ecological, and predictive risk assessments. She has a background in chemistry, including environmental chemistry, toxicology, and information technology. She has research experience in bioremediation and conducted laboratory analyses of soil samples for organic compounds using EPA methods. She has used several U.S. EPA models to estimate the potential risk of contaminants to various human and ecological receptor populations. She has produced risk assessments that have been accepted by regulatory agencies that would result in acceptable levels of risk. Laura has successfully conducted risk assessments evaluating Human Health Risk from metals, polycyclic aromatic hydrocarbons, (PAHs), organics, and several other soil and sediment contaminants.

Gregg Bryden, CHMM, Risk Assessment Integration

Mr. Bryden is a senior project manager with over 16 years of experience managing or contributing to site investigations, risk assessments, site remediation, water, wastewater, and storm water projects.

The duties he performs include: Environmental Site Assessments, remedial investigations, regulatory agency permitting negotiation, evaluating ecological risk, assessing sediment and pore-water quality at aquatic cleanup sites, collecting receiving water and sediments for toxicological testing; monitoring industrial waste effluents; assessing hazardous waste-contaminated sites; supervising the collection of sediment samples and collecting soil cores. He also has experience in laboratory quality assurance, the management and disposal of hazardous wastes.

Said Amali, Ph.D., Fate and Transport

Dr. Amali has extensive background in contaminated site characterization, data analysis, and quantitative modeling of organic and inorganic chemical fate and transport in the environment. His expertise includes evaluations of fate and transport of contaminants in dissolved, vapor, and non-aqueous-phase liquid forms for petroleum hydrocarbons, industrial solvents, and metals. Said has developed and overseen the implementation of remedial investigation work plans for a number of petroleum hydrocarbon impacted facilities, and has been integral to modeling efforts involving LNAPL movement and natural attenuation (intrinsic biodegradation) at diesel fuel release sites. His background in applied soil science includes specialized expertise in vadose zone modeling of fluid and vapor phase contaminant fate and transport.

Julie Reid, CHMM, Quality Assurance

Ms. Reid evaluates industrial operations for environmental compliance and has developed management plans (contingency, pollution prevention) for regulatory compliance and more efficient operation. In addition, she has experience in monitoring and evaluating contamination of hazardous waste sites. She is Kennedy/Jenks Consultants' lead laboratory coordinator and performs quality assurance/data validation activities for sampling programs. Julie has additional experience in creating and maintaining databases for analytical and field data. Prior to joining Kennedy/Jenks Consultants, Julie worked in an environmental laboratory, performing analyses on water, wastewater, soils, and sludges.

**Key Personnel –
Windward Environmental**

Mike Johns, Ph.D., Aquatic/Sediment Risk and Toxicology

Dr. Johns is an aquatic scientist specializing in aquatic ecological risk assessments, particularly those associated with contaminated sediment. The emphasis of his 25 years of professional

experience has been in the effects of toxic pollutants on aquatic organisms. Mike is responsible for the management of large multitask, multidisciplinary environmental investigations, including RI/FSs and NRDA's. He is the program manager for the Lower Duwamish Waterway RI/FS and the Grand Calumet River NRDA, Indiana. He was also strategic and technical lead for the Calcasieu Estuary Combined RI/FS and NRDA, Louisiana; two Supplementary Remedial Investigations at the Harbor Island Superfund site in Seattle; and two NRDA injury determination studies. As a principal investigator at EPA's National Research Laboratory in Narragansett, RI, he served as Assistant Technical Director to the joint EPA/ACOE Field Verifications Program, which was one of the first comprehensive programs to assess the impacts of contaminated sediment on aquatic species, and one of the first applications of an ecological risk assessment to contaminated sediments. Mike is a recognized expert on the use of bioassessment techniques to evaluate sediment contamination. He was responsible for the development of the Neanthes bioassay for use by EPA and ACOE.

Lisa Saban, M.S., - Aquatic/Sediment Ecological Risk

Ms Saban has served as a project manager or lead ecological risk assessor for a variety of ecological risk assessments (ERAs) and sediment investigations over the last 11 years, managing and conducting environmental studies on the local, national, and international level, for both private and public sector clients. She has evaluated aquatic impacts from multiple stressors, including physical stressors, pathogens, PCBs, chlorinated hydrocarbons, metals, and PAHs. She has extensive experience negotiating in client-stakeholder interactions, directing oversight and review of sediment and water quality studies, toxicological testing procedures and protocols, ERAs, sediment restoration, ecotoxicology issues, NRD, ESA, and environmental benefits analyses. She has

managed a 2-year watershed assessment study, evaluating point and non-point source pollution and determining management guidelines for source control. She is focused on risk management strategies to reduce potential exposure in a cost-effective manner.

Lisa has also been involved in numerous stakeholder groups. She was actively involved in the Drayton Harbor Watershed Advisory Committee during her two-year watershed assessment project. She was also actively involved in the Hickam AFB stakeholder group, evaluating water quality, risk assessment, and sediment issues for two large canals. Her work in this committee prompted her to develop a presentation on stakeholder involvement and processes at a national conference. Lisa worked in a large stakeholder team as a third-party consultant for both the state government and a private sector client to come to consensus on risk management issues related to petroleum hydrocarbons, PCBs, and metals in an aquatic environment.

Matt Luxon, M.S., - Aquatic/Sediment Risk; Habitat and ESA

Mr. Luxon is a terrestrial and aquatic risk assessment specialist and a wildlife toxicologist with more than eight years of experience working on environmental projects at all levels. His project experience has included work on ecological risk assessment, whole effluent toxicity testing, sediment and water quality assessment, and aquatic, terrestrial and avian ecology. Particular areas of interest include ecological risk assessment incorporating multiple stressors and toxicological effects on community ecology.

Matt has extensive expertise using GIS tools in ecological risk assessments to determine the spatial relationships of chemical contaminants and ecological receptors. He managed the GIS for the Institute of Environmental Toxicology and Chemistry. His Masters thesis incorporated GIS based modeling of the sources of stressors affecting the salmonid community of the upper Willamette River watershed in Oregon. He has also applied these tools to ecological risk

assessments of Whatcom Creek and the Lower Duwamish Waterway in Washington.

Matt has extensive expertise in both aquatic and terrestrial habitat analysis including analysis of riparian habitat for salmonids in the Willamette River, Oregon and investigations of terrestrial habitat relationships for several avian wildlife species in Washington and Oregon. His work also includes salmon habitat improvement projects on several streams in Northwest Washington including the Green and Skykomish Rivers.

Matt has extensive experience in issues related to threatened, endangered, and sensitive species. He has worked on habitat assessments for spotted owl, conducted research in support of a HCP for the marbled murrelet and other species of concern on Washington DNR lands. Additionally in conducting the assessment of risk to fish in the Lower Duwamish Waterway Superfund site, Matt has gained expertise in assessing risk to listed Pacific salmonids.

Matt has been at the forefront of modeling ecological risk at the regional scale. His work includes developing comparative risk models to assess the relative contribution of various chemical, physical, and biological stressors to degradation of valued resources. He was an invitee to the recent SETAC-sponsored Pelston conference on complex stressors, which developed tools in toxicology and risk assessment for evaluating effects of multiple stressors on multiple receptors at the regional scale.

Tad Deshler, M.S., - Human Health Risk Assessment

Mr. Deshler is an environmental scientist with 15 years of experience in a variety of environmental disciplines, including ecological and human health risk assessment, bioassessment and habitat analysis, sediment management, and natural resource damage assessment (NRDA). His range of experience allows him to be effective at both the strategy and policy levels and at the highly technical levels associated with quantitative

environmental science. Tad's HHRA specialty is fish and shellfish consumption at large aquatic sites. He has developed a "market basket" approach at sites in the Pacific Northwest that utilizes regional fish consumption studies and site-specific data on tissue chemistry. The market basket approach provides a realistic estimate of risk from the site and allows for partitioning of risk to different sources depending on the life history of fish and shellfish found at the site. Tad is a skilled communicator of scientific information to both technical and lay audiences. In addition to a number of presentations at scientific conferences, he has communicated both human health risk assessment study design and risk characterization information to lay audiences directly affected by hazardous waste sites.

Susan McGroddy, Ph.D. - Environmental Fate and Transport

Dr. McGroddy has conducted research on the environmental fate and transport of nonpolar organic contaminants such as PAHs and PCBs in soils and sediments. Her research and work have focused on the effects of organic matter composition on the partitioning behavior of organic contaminants. She has measured the in situ sediment porewater partitioning of PAHs and PCBs and used these data to identify sources of PAHs and their potential bioavailability. The results of this work have important implications for efforts to model the transport and fate of PAHs in aqueous systems and to predict bioavailability of these compounds.

She has investigated the interactions between the environmental chemistry and biology of PCBs in a recent study conducted in the Hudson River. PCB congener patterns were measured in resident and migratory fish in order to use compositional patterns to identify potential pathways of exposure to the different species.

Susan has used fingerprinting techniques to identify potential sources of PCBs and PAHs. She has experience using PCB congener data and PAH compound ratios to identify potential sources of the compounds as well as to identify

environmental processes responsible for observed pattern alterations.

One focus of Susan's work has been identifying site-specific controls for contaminant bioavailability and transport. In general, factors such as the quantity and composition of sediment and soil organic matter will affect the fate and transport of PAHs and PCBs, and redox conditions will control the availability of inorganic contaminants.

Kathy Godtfredsen, Ph.D., - Ecological Risk Assessment

Dr. Godtfredsen is an environmental chemist and engineer with more than 10 years of experience evaluating the transport, fate, and effects of inorganic and organic contaminants in water, sediments, and soils. She specializes in assessing aquatic systems, with particular emphasis on ecological risk assessment and modeling environmental contaminants. She has performed numerous aquatic and terrestrial ecological risk assessments at hazardous waste sites with multiple contaminants for both industrial and government clients. These assessments have ranged from screening level assessments to detailed risk assessments used to recommend cleanup levels for sediment. In addition, Dr. Godtfredsen has recently published several articles addressing the mobility and bioaccumulation of trace metals in aquatic systems.

Kathy provided review and guidance in developing the latest EPA Environmental Response Team (ERT) ecological risk assessment guidelines. She was an invitee and participant in the recent SETAC-sponsored Pellston workshop, which reassessed metals criteria for the protection of aquatic life. She has provided technical assistance and guidance to the EPA Office of Water and Office of Technology, preparing environmental toxicity fact sheets on toxic substances, a guidance manual on the bioaccumulation of superlipophilic contaminants, and a white paper on modeling bioaccumulation in aquatic and terrestrial ecosystems. She has also reviewed an

EPA guidance manual for calculating total recoverable permit limits.

Key Personnel -

Fishman Environmental Services, LLC

Steven Johnson, B.S., - Aquatic Ecology, and Endangered Species

Mr. Johnson has 21 years environmental research and consulting experience. He is a member of the American Fisheries Society and Western Dredging Association. Steve's specialties include Endangered Species Act policy and compliance issues; fisheries biology; aquatic ecology; fish passage, watershed analysis; stream habitat assessment and restoration; water and sediment quality; and stormwater and erosion control planning. Steve has been with FES for the past 13 years where he is responsible for coordination, management and implementation of the aquatic sciences program. He has prepared Biological Assessments for a wide range of public and private entities for water supply, port and other water-related projects. His work has also included analysis of alternatives and aquatic mitigation design for water-related development projects such as port facilities, marinas and water intake/outfall structures.

Paul Fishman, M.S., Aquatic Ecology

Mr. Fishman is a Board Certified Environmental Professional who will serve as contract manager and provide QA/QC for FES for this project. His specialties include aquatic ecology, regulatory policy and strategy, public facilitation, and natural resource planning. Paul has over 30 years management experience in natural resource assessment and planning and extensive experience in aquatic and wetland ecology, with numerous projects involving fish and benthic invertebrate issues, riverbank stabilization and riparian corridor assessment and management. Paul has worked to bring correct scientific principles of river/floodplain ecosystem ecology to large-river projects, recently co-authoring the Willamette Riverbank Design Notebook for the Portland Development Commission. Paul has conducted studies of aquatic contaminant

bioaccumulation, and HHRA for Columbia Slough in Portland.

Anthony Laska, Ph.D., Aquatic Assessment

Mr. Laska has specialized in estuarine ecology with over 24 years experience in ecology and natural resource management. Tony's specialties include natural resource public policy and development, municipal environmental management, coastal zone management and project conception/ development. He has managed the Clark County Public Utilities/U.S. Army Corps of Engineers Limiting Factors Analysis for the Salmon Creek Watershed in Washington. He managed the Evaluation of Environmental and Land Use Issues for a Sand Lake Estuary area landowner, Multnomah County Drainage District #1 Sediment Sampling, Design and Permitting, and more recently managed FES' component of Toyota Facility Redevelopment-Terminal 4, for the Port of Portland. Tony is an ichthyologist by training, having specialized in Gulf Coast barrier island ecology.

Kim Gould, B.S., Sediment Biology

Ms. Gould has expertise in water quality, stream habitat and fish passage assessment, threatened and endangered fish consultations and biological assessments; macroinvertebrate and fish taxonomy and field identification; statistics and data analysis. Kim's expertise includes ESA Section 7 consultations. Kim also provides GIS mapping support as needed. Previous experience includes fish presence and passage surveys for state and federal agencies and life history studies of endangered species affected by the Exxon Valdez oil spill in Prince William Sound, Alaska. Kim's Fisheries degree included a concentration in aquatic ecology and exploration of correlations between aquatic macroinvertebrate diversity and land use patterns in a Willamette Valley watershed.

Key Personnel

Other Support Scientists

**Eric Friedenwald-Fishman
Communication/Facilitation**

Kennedy/Jenks' Risk Team also includes access to an experienced facilitator, Eric Friedenwald-Fishman, as needed, to provide third party support if contentious issues develop in the project.

Eric, of Metropolitan Group (MG), is a leading national social communications and facilitator, who understands societal interests and concerns of public agencies, private industry and tribal governments. Eric has served as the key strategist on hundreds of projects. He has extensive relationships among regional and national corporate and public sector leaders and decision makers. Eric is an expert facilitator to multiple stakeholders, policy makers, committees and groups representing diverse interests. Eric also has extensive experience developing and sustaining coalitions, and has coordinated many multi-jurisdictional projects involving environmental policy development.

Kennedy/Jenks' Risk Team is also supported by several other biologists, risk assessors and GIS experts. Team members are experienced in the Endangered Species Act and other regulatory issues that impact risk assessments. Key team members are locally available and will be available for the project.

The qualifications of the Key Risk Team are also included as full resumes available on request.

Risk Assessment Experience of the Team

Kennedy/Jenks' Risk Team has conducted ERAs ranging from simple, scoping and screening level assessments to multi-constituent, complex site assessments for organic and inorganic mixtures in several media.

Our technical expertise in risk assessment and basic ecological principals can reduce remediation costs by focusing on the actual ecological issues at the site rather than on non-

risk based public concerns for the environment. Kennedy/Jenks' Risk Team senior scientists have the risk assessment experience and technical background to successfully negotiate reasonable, risk management options with regulatory agencies.

Risk Assessment Experience - Kennedy/Jenks Consultants

Kennedy Jenks' risk assessors have conducted numerous ecological and human health risk assessments focused on metals, PCBs, PAHs, and organochlorines. All risk assessments are developed in accordance with U.S. EPA and appropriate state Department of Environmental Quality guidance. Kennedy/Jenks scientists have conducted a wide range of environmental assessments including sites with only one potential contaminant, river sediment reaches containing important benthic communities and prey items, and large complex sites with multiple media and multiple receptors. Potential adverse effects of contaminants are extrapolated to generate protective levels for each medium of concern. This results in protective mitigation strategies for human and aquatic and terrestrial receptors for the ecosystem of interest and the Study Site. Potential risk to terrestrial and aquatic wildlife within the study areas were developed that included food web models based on refined estimates of exposure. Evaluation of the potential risk at the sites included risk to the sediment community and aquatic prey items so that the ERA could be used to recommend areas that required no further action and those areas that might require additional evaluation. Currently, Kennedy/Jenks Consultants risk assessors have produced HHRA and ERA for soils, sediment, surface water, groundwater, and air. Kennedy/Jenks has in-house versions, and uses all currently accepted computer models for risk assessment, and has generated probabilistic risk estimates for several wildlife exposure scenarios

Risk Assessment Experience – Windward Environmental

Windward Environmental has conducted dozens of evaluations where chemicals were the stressors of primary concern. These projects have culminated in products ranging from brief, rapidly prepared technical memoranda to formal multi-year risk assessments conducted according to EPA guidelines. Windward's approach to risk management emphasizes use of the appropriate level of risk assessment to meet the study objectives and the application of site-specific data to develop a realistic estimate of risks.

Windward's staff of biologists, chemists, and toxicologists takes an interdisciplinary approach to ecological risk assessment. We have conducted both predictive risk assessments, estimating effects using literature data, and deterministic risk assessments, measuring effects in the field. Where appropriate for a project, we prefer to use deterministic methods founded on bioassessment principles. HHRA at aquatic sites must address a number of exposure pathways, but the driver of remediation is often consumption of contaminated fish and shellfish. Windward has developed specialized expertise in assessing human health risks from this pathway. Windward staff have evaluated risks from fish consumption in both freshwater and marine settings, prepared a guidance document for conducting fish consumption surveys, and developed study design strategies to evaluate fish contaminant data for use in fish consumption advisories. For this and other exposure pathways, Windward focuses on quantitative uncertainty analysis, typically using probabilistic analysis, to help identify the primary variables responsible for the conclusions of the assessment. These analyses also help in identifying areas where additional data collection might be warranted to provide a more reasonable risk estimate, and ultimately reduce the need for remediation.

Risk Assessment Experience - Fishman Environmental Services (FES)

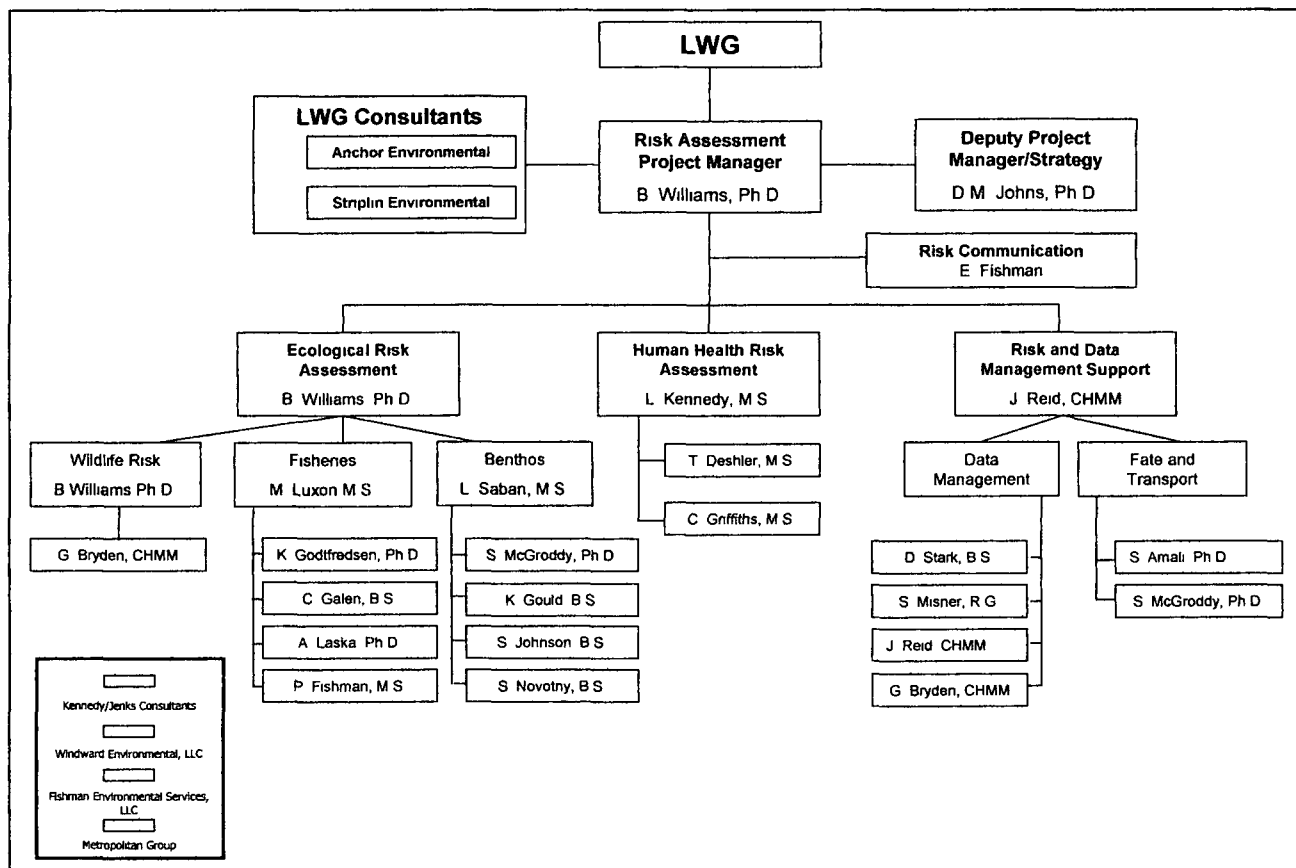
Fishman Environmental Services (FES) has conducted or supported numerous environmental assessment projects in the Northwest and the Willamette River. FES was instrumental in identifying locations in the lower Columbia River that might serve as potential dredge material rehandling sites for the Columbia River Channel Deepening Project. FES studied these sites (River Mile 50-53, and River Mile 103-105) to determine their value as habitat for juvenile white sturgeon. The study tasks included: sampling and characterizing sediments; sampling for juvenile sturgeon using beam and shrimp trawls; and sampling benthic invertebrates using a van Veen sampler. Study results assisted the Corps of Engineers in their decisions related to dredge material management.

FES was the technical consultant on a team contracted to develop design guidelines for riverbank treatments in the downtown Portland Willamette River reach. The team worked collaboratively to develop the Design Notebook with agencies, and produced a final draft. FES prepared a technical report describing current knowledge regarding fish ecology in the lower Willamette River.

FES designed and conducted a study to demonstrate the feasibility and utility of a long-term biomonitoring program for Columbia Slough management. The study design utilized the Asiatic clam (introduced species in the Columbia River system) and protocols similar to the federal Mussel Watch program to measure the bioaccumulation of trace metals and organic compounds, including PAHs, pesticides and PCBs, in living tissue over periods of 2-4 months. The study concluded that the method would be feasible and could provide long-term trend data for water quality management.

Summary Resumes of Key Personnel are included as Attachment A.

Figure 1. Organization Chart – Risk Assessment



Appendix A

Resumes of Key Personnel

Kennedy/Jenks Consultants

Engineers & Scientists

Bill A. Williams, Ph.D.

Senior Scientist

Education

(b) (6)

Experience

(b) (6)

Certifications and Training

(b) (6)

Professional Summary

(b) (6)

(b) (6)



Relevant Project Experience:

■ (b) (6)

(b) (6)



(b) (6)



Bill A. Williams, Ph.D.

Page 4

(b) (6)

A large rectangular area of the document is completely redacted with a solid gray fill, covering the majority of the upper half of the page.

Affiliations

(b) (6)

A rectangular area of the document is redacted with a solid gray fill, located below the 'Affiliations' section header.

Awards and Honors

(b) (6)

A large rectangular area of the document is redacted with a solid gray fill, covering the lower half of the page below the 'Awards and Honors' section header.

Bill A. Williams, Ph.D.

Page 5

Recent Workshops and Invited Panel Member

(b) (6)



Inventions/Patents

(b) (6)



(b) (6)



Recent Chair/Session Organizer Technical Meetings

(b) (6)



Book Chapters

(b) (6)



(b) (6)



(b) (6)



(b) (6)



Said Amali, Ph.D., P.E.

Senior Associate Scientist

(b) (6)



Said Amali, Ph.D.

Page 2

(b) (6)



Said Amali, Ph.D.

Page 3

(b) (6)



(b) (6)



(b) (6)



Said Amali, Ph.D.

Page 6

(b) (6)



Laura J. Kennedy, M.S.

(b) (6)



(b) (6)



(b) (6)



Gregg William Bryden, CHMM

Senior Associate Environmental Scientist

(b) (6)



(b) (6)



(b) (6)



(b) (6)



Julie A. Reid

Engineer

(b) (6)



(b) (6)



Steve D. Misner, R.G.

Geologist

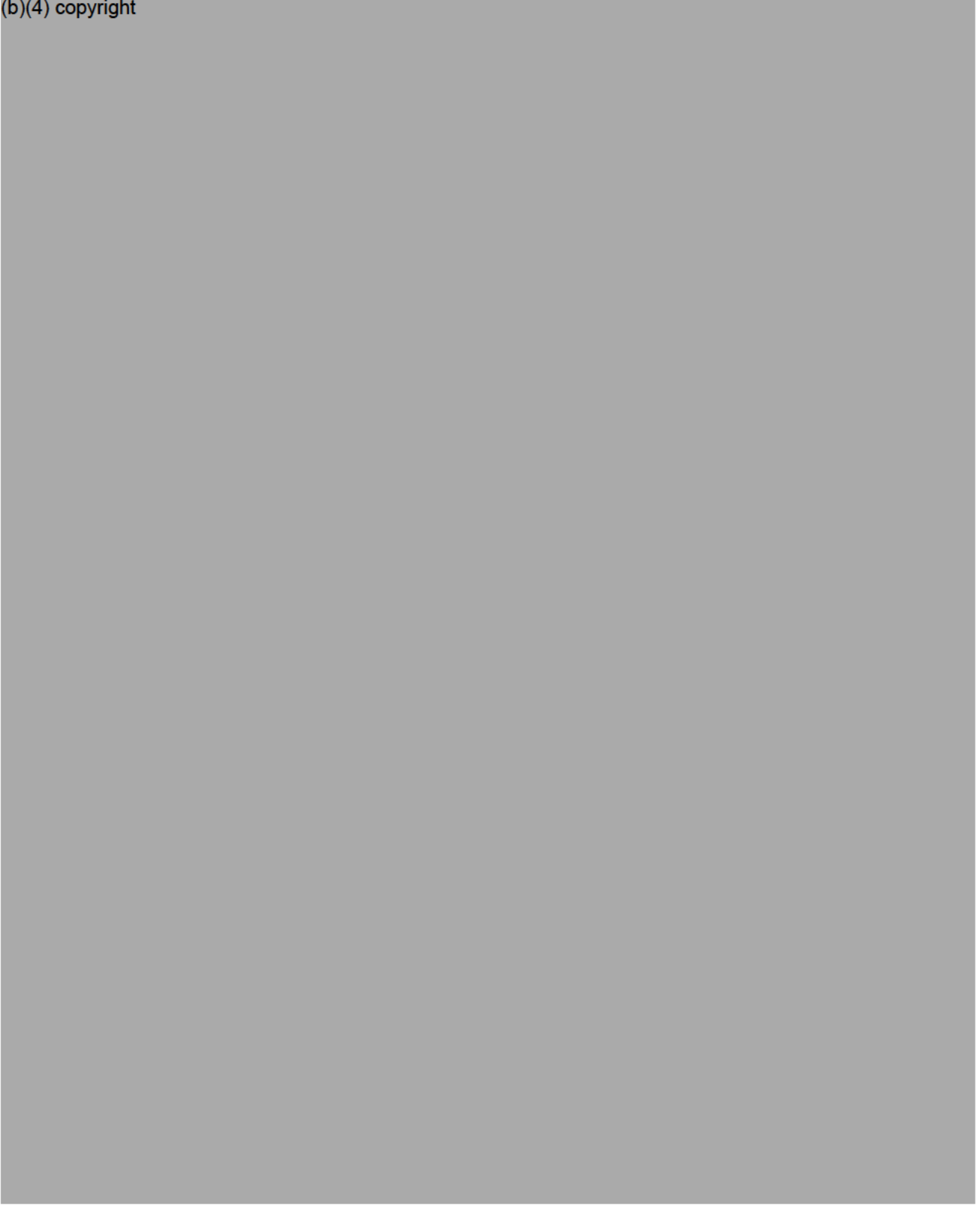
(b) (6)



(b) (6)




(b)(4) copyright



Steve D. Misner, R.G.

Page 4

(b)(4) copyright



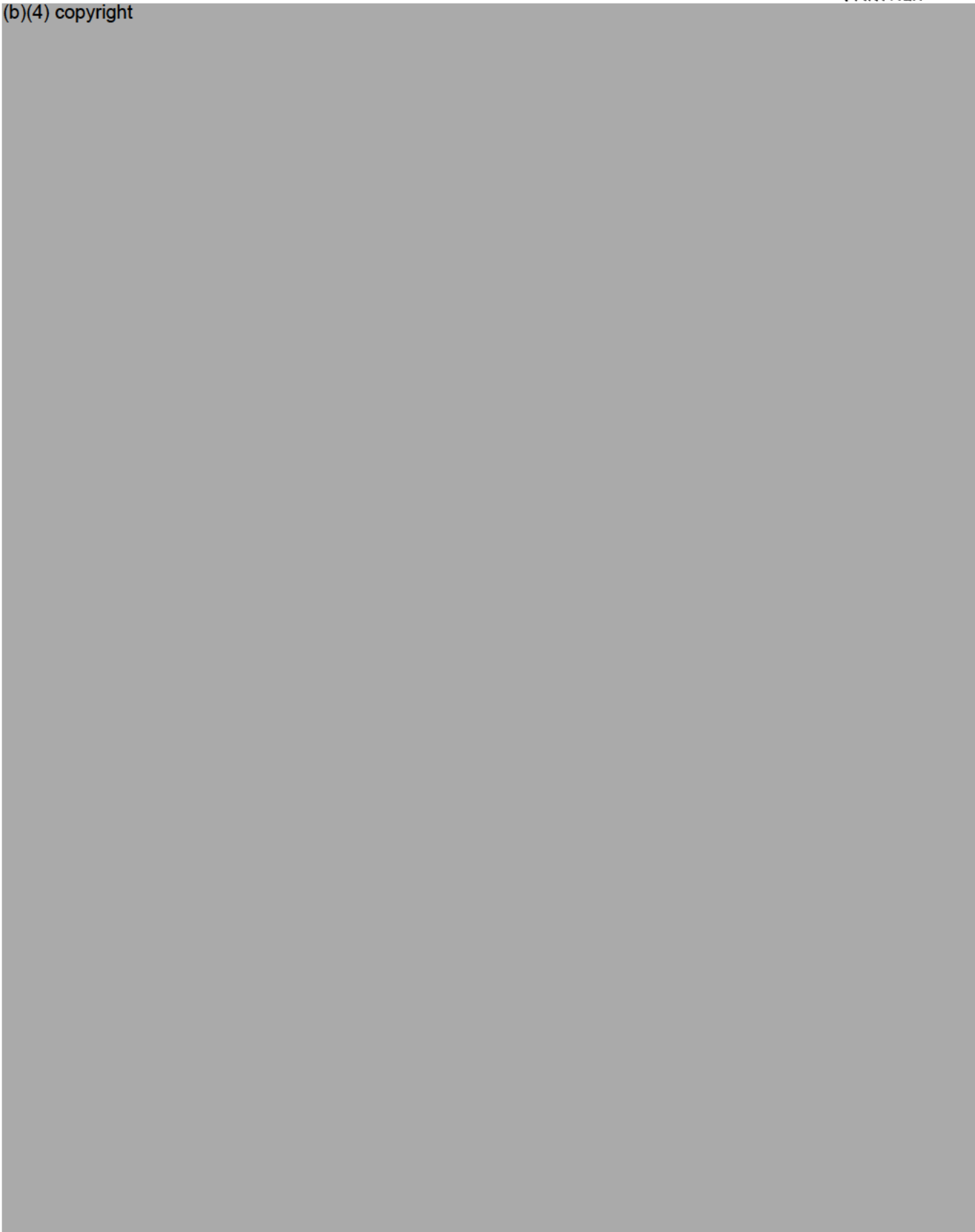




D. MICHAEL JOHNS, PH.D.

PARTNER

(b)(4) copyright

A large, solid gray rectangular area covers the majority of the page, indicating that the content has been redacted under FOIA exemption (b)(4) copyright.

